Setting Conditions for Success: An Air Defense Perspective

by Lieutenant Colonel Stephen T. Jordan, US Army

THERE CERTAINLY HAS BEEN no shortage of articles written about Force XXI over the four years since General Gordon R. Sullivan's first message to senior Army leaders in March 1994. We can be equally certain that the well will not run dry now that the Division XXI Advanced Warfighting Experiment (DAWE) at Fort Hood, Texas, has drawn to a close and the Army begins to digitize the entire force. This article will shed new light on the process as it pertains to one branch's approach to the complexities involved in fielding, testing, experimenting with and sustaining this type of force. While much has been accomplished, the toughest challenges are still ahead!

The roots of the information-age force, knowledge-based operations and Force XXI itself can be traced back many years before Sullivan decided that this was the path the Army needed to take to maintain technological superiority. Most of what was written and studied, however, was more conceptual and philosophical than practical. Intuitively, information-based operations was a concept hard to dispute. After all, who could argue against the advantages afforded a force that knew exactly where it was at all times and exactly where the enemy was. One might say that it provides the ultimate "high ground." The fog and friction of war, if not eliminated, were certainly reduced to a manageable level, and battle command was as much science as art—in theory. Regardless of where the roots of Force XXI lie, the fact remains that, for most of the Army, Force XXI and digitization began the transformation from theory to practice with National Training Center (NTC) Rotation 94-07 when the first digital systems experiments took place at Fort Irwin, California. It continued through the series of experiments that concluded with the DAWE conducted at Fort Hood from 5 to 13 November 1997.

While this digitization process was new for most of the Army, that was not the case for the Air Defense Artillery (ADA). All AWEs that led to the Task Force (TF) *AWE* NTC rotation in March 1997, and the DAWE Battle Command Training Program (BCTP) exercise in November 1997, were important, but these latter two were to serve as the means for the Army to restructure the entire 21st-century force. And while both exercises were overwhelming successes across all battlefield operating systems (BOS) and organizations, ADA was continually singled out for proficiency in the complex digital environment. Some of the earliest comments from senior Army leaders at Fort Irwin in March was that ADA had created a synergy among its four initiatives—Forward Area Air Defense Command, Control, Communications and Intelligence (FAADC^{3}I), Sentinel, Linebacker and Avenger—that made them clear battlefield winners. Again, during the DAWE BCTP exercise in November, ADA was singled out for bringing a digital capability to the force that enabled far greater lethality, survivability and agility than ever before.

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How did ADA bring together the mix of systems, soldiers and technology that enabled success? The reasons for ADA's success through this process were a 10-year head start, the identification and

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ADA's Head Start

For ADA, what is now called Force XXI began in the early- to mid-1980s at Fort Bliss, Texas. ADA, along with the Field Artillery, had been digitized for many years. It has long been acknowledged that the best way to put steel on target is through a sensor-to-shooter link that is both fast and accurate. There are no analog solutions to this problem. High to Medium Altitude Air Defense (HIMAD) systems, the first ADA systems to digitize, have evolved over the years in both speed and accuracy. Why couldn't short-range systems be afforded these same efficiencies? To that end, senior leaders also initiated a long-range plan to digitize short-range air defense (SHORAD) just as HIMAD had done years before. The plans were developed for a command and control (C^2) system that would digitally connect SHORAD sensors and shooters, SHORAD to HIMAD and SHORAD to any or all air defense systems—joint or otherwise—in any theater of operations.

By the time the TF and DAWE culminating events arrived and digital systems in the form of *Applique* were strapped onto a brigade combat team's vehicles, ADA was in the midst of a Department of the Army Master Priority List for fielding digital systems across the SHORAD force. This was not "rocket science" for ADA, nor were ADA soldiers the least bit intimidated by the powerful tools at their disposal. Before installing *Applique* computers on weapon systems, ADA leaders already had situational understanding in the form of FAADC³I.

The FAADC³I computers in all fire units provided real-time position and C^2 links to the lowest level. The FAADC³I network linked the new Sentinel radar's air picture to every shooter and command post in the division. Had there been an Air Force Airborne Warning and Control System (AWACS) or Navy Hawkeye C^2 aircraft operating in the area, these air pictures also would have been integrated and available to the entire force. Finally, "slew-to-cue" technology in the fire units allowed squad leaders to take digital data provided by the radar and FAAD system, select a target and place it directly in gunners' sights. *Applique* served as a useful enhancement to existing ADA computers, providing leaders and soldiers the means to pass orders and overlays in addition to the positional and sensor data already on hand. As critical as it was to have the right tools, it would have been impossible to bring them all together throughout the experimentation process without a single, unifying theme and end state among all key players.

Weighting the Main Effort

From the moment I entered the pre-command course at Fort Bliss in April 1996, I knew how important Force XXI experimentation was to Fort Bliss and the ADA community. The ADA chief, Major General John Costello, remarked that the shape of divisional ADA for the 21st century would be determined by the soldiers of 1st Battalion, 44th ADA Regiment (1-44 ADA) in the TF and Division XXI experiments. He further stated that the entire staff at Fort Bliss was available and ready to provide whatever assistance was required to ensure our soldiers had the tools to succeed. These words were backed up with action. Throughout the intense two-year process, Fort Bliss and the battalion worked hand-in-hand to accomplish the mission.

In preparation for the TF exercise, an Avenger institutional trainer was positioned at Fort Bliss to ensure our Avenger gunners were the sharpest ever at NTC. Linebacker crews were trained at Huntsville, Alabama, in a virtual simulator to ensure that they too were as sharp as they could be. Multiple integrated laser engagement system (MILES) gear was shipped to Fort Hood for all systems to ensure that the gunnery skills developed in the simulators could translate to the killing mechanisms used at the NTC. For months prior to the rotation, video teleconferences were conducted between the battalion's key leaders and the ADA observer controllers (O/Cs) at Fort Irwin. Seminars and open information exchanges served to focus train-up efforts. In addition to internal battalion O/C efforts, the ADA school sent a handful of experts to the battalion to further enhance the value of the pre-NTC training events.

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The Avenger FAAD fires the full range of Stinger missile rounds.

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For the Division XXI BCTP exercise, we acknowledged that the ability of simulation center operators, or "pucksters," to translate orders into the Corps Battle Simulation (CBS) was critical. The operators needed to understand and be proficient with the intricacies of the simulation itself and build a solid base of understanding on how to translate plans and orders into battlefield actions. To that end, Fort Bliss installed CBS computer terminals in the battalion's simulation room connected via phone line to the Fort Bliss simulation center. Operators drilled daily for months prior to the experiment, and their proficiency was unparalleled. Throughout the entire period, battalion and battery C^2 operators drilled on the FAADC^{3}I battle command system. Despite continuous software upgrades, these soldiers knew the equipment they operated, and they knew their jobs.

The information age brings with it technology that is both complex and rapidly changing. Dealing with technology that outdates itself every three years inserts a difficulty level into operations and training never before experienced. The need for resident, technical expertise in a digitized battalion was recognized early by Fort Bliss leaders. A warrant officer specialty course was established to produce C^2 technicians. To date, ADA is the only branch to have dedicated force structure for this critical function. The first course graduate was assigned to 1-44 ADA early in the process, and the benefits reaped along the way were immeasurable. When the contractors pack up and go home, these technicians will ensure the digital skills and maintenance necessary to succeed remain.

ADA's success was due to more than just the schoolhouse—it was a total team effort. III Corps' 31st ADA Brigade stepped up to the plate early to ensure that ADA efforts, from top to bottom, were synchronized. The systems we would take to Fort Irwin had to be fielded to the battalion first, NET (new equipment training) qualified and then taken to the field. The US Army Training and Doctrine Command system manager for SHORAD at Fort Bliss micromanaged the hundreds of details involved with bringing the new equipment on line. Program managers (PMs) and contractors worked side-by-side with the battalion's soldiers every step of the way. They left no problem unsolved, no issue unworked. To ensure success, PMs placed their best employees at Fort Hood from the beginning, and they were there at each critical step along the way. FAADC^{3}I, Sentinel, Linebacker and Avenger—all had outstanding representatives. Periodic in-progress reviews with all parties ensured that each issue was addressed and resolved. When it came time to demonstrate the awesome capabilities ADA was putting on the battlefield, nothing was left to chance.

Soldiers

I can't say enough about our soldiers, because they were the key to our success. We demanded more of soldiers to execute Force XXI experimentation than we should ever ask of them. For 18 months, we presented them with seemingly insurmountable challenges, and each time they rose to the occasion. There was no predictability in their lives, no time to rest and reflect, only time to be driven further and harder than any soldiers I have seen. There were no complaints. Every soldier knew he was taking part in an event that was shaping the entire Army for the next 20 years. The soldiers knew they were writing history, and they embraced the process as an opportunity to make a contribution that few soldiers of any era have matched.

If it were only the fieldings and experimentation they had to contend with, it would have been easy—a single focus with a single goal. But it was not quite that simple. Concurrently, there were routine training requirements such as gunnery, platoon

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evaluations, crew and battle drills, common soldier task testing, deployments, maintenance and services. All of these kept the plate full. The Army is truly blessed with the finest soldiers of any era—intelligent, dedicated, hardworking and with a keen desire to be the best they can be. Some have said along the way that perhaps the technological requirements of this new Army will surpass the abilities of soldiers and leaders. Not true. The technology experimented with, and currently being fielded, was embraced by the soldiers. They understand it and are as familiar with it as they are with their individual weapons. The bottom line, though, is that there is not a single piece of digital equipment on the battlefield that operates by itself. It is these soldiers who bring it to life and cause it to function properly. Soldiers and leaders, using the advanced tools at their disposal, will no doubt keep this Army the most powerful in the world. The US Army's "silver bullet" has always been its soldiers.

Lessons Learned

Information-age operations have created a battlefield with significantly different implications for all BOS. These implications have forced us to look at tactics, doctrine and employment considerations differently as well. The TF and DAWE served as a laboratory for experimentation. Doctrine writers continue to wrestle with the implications and lessons learned from those experiments. The following considerations may provide food for thought as we compile these lessons:

- *Information Dominance*—is a critical factor on the 21st-century battlefield. The ability to "strip away" the enemy's eyes through timely and effective SHORAD fires will enhance the division's ability to gain and maintain information dominance. SHORAD's demonstrated capability against unmanned aerial vehicles (UAVs) and drones contributes significantly to information dominance. Likewise, general support (GS) SHORAD assets, positioned by the divisional ADA commander and shifted in accordance with the digital, integrated intelligence preparation of the battlefield, are instrumental to protecting critical division assets and moving them if observed by enemy UAVs.
- *Digital Identification*—SHORAD engagements can now be based on digital identification. As a result of digitized SHORAD weapon systems, targets can now be engaged at the maximum range of weapon systems rather than the shooter's visual range. This increases the SHORAD stand-off range threefold and significantly helps protect divisional assets. Digital linkage to HIMAD and joint air defense identification information makes this possible.
- *Targeting and Fires*—The real-time intelligence-gathering capability of the FAADC³I-equipped ADA BOS with regard to locating and identifying enemy aviation forward operating bases, forward area arming and refueling points and tactical ballistic missile (TBM) launch points, provides significant offensive counterair capability. FAAD calculates the impact points of TBMs and provides intelligence assets with information concerning potential enemy movements based on aircraft avenues of approach and forward staging.
- *Synergy of Corps and Division Patriot and SHORAD*—The synergy of corps ADA weapons, to include Patriot, SHORAD and divisional systems, provided a mix able to counter the diversity of 21st-century threats. The fixed-wing, rotary-wing, TBM, cruise missile and UAV threats encountered during the DAWE were extremely robust, a likely harbinger for 21st-century battlefields. The combination and integration of corps ADA and the ADA available to the division in the conservative heavy division design provided a synergy that protected the force and contributed significantly to the division's ability to gain and maintain information dominance.
- *Situational Understanding*—The situational understanding provided by digital systems enhances the division's capability to plan future operations based on the real-time battlefield disposition of friendly and enemy units. It allows the commander to better control forces; mass air defense at critical times and locations; maximize coverage and system capabilities; and increase the timeliness of information dissemination.
- *Task Organization*—ADA "slice" mentality is inappropriate on the 21st-century battlefield. GS employment must be at the division commander's

discretion, depending on the situation. He now has 60 weapon systems available, rather than 88, which will be dispersed at greater ranges along the width and depth of the battlefield. Hence, ADA systems must be carefully task organized over this expanded battlespace and immediately responsive to the battle's rapidly changing nature. The responsiveness, flexibility and agility of ADA assets fought during the DAWE—under the division commander's absolute control—resulted in a lethality far greater than before and a survivability rate never before experienced.

- *Support Relationships*—These must be redefined so that 20th-century definitions do not inhibit the capabilities of digital forces. Situational understanding enables unprecedented agility and flexibility. ADA units must be at the right place and time on the battlefield—not every place. Why must a GS unit receive its support from the parent unit? Why not from the unit it is supporting or the unit in whose area it is operating at a given point in the battle? Optimally, this lends itself to an *area support* concept, which would require a complete overhaul in the way the Army currently does business. If digitization affords the capability for "just-in-time" logistics, why not "just-in-time and space?" Retaining GS air defense units must be viewed as retention of flexibility rather than a commitment of logistic support.

The Road Ahead: Some Tough Questions

How do we take what we have learned and build from here? We have really only scratched the surface. 4th Infantry Division (EXFOR) soldiers have taken digital systems and become extremely proficient in their use. But how do we sustain these skills? How do we compensate for the normal soldier/leader rotation from units? In time, as the Army digitizes across the entire force, this will not be an issue. For the time being, the division must be self-sustaining. Internal training programs must replace institutional training for the foreseeable future, and that is no easy task. Having a C^2 technician on hand will ease the burden for ADA, but what about everyone else? What happens when all of the contractors that have so ably assisted the division for the past 18 months leave? Does each unit have the required expertise to maintain the level of proficiency recently demonstrated?

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How do we train at the NTC as the Army digitizes? The equipment issued to units there is different from the equipment the unit trains on at home station. ADA is there already, and the rest of the division and Army will soon follow. It will be many years, if ever, when Linebacker, Avenger, Sentinel and FAADC^{3}I are resident at NTC, because there is little money to ship an entire battery's worth of equipment for each rotation. What about actual deployments? As the Army digitizes, home-station equipment will look less and less like equipment pre-positioned around the world.

What about logistics? Computer hardware and software requirements open up a whole new series of supply and maintenance issues. For instance, who will stock and repair cables, removable hard drives, local area networks, routers, monitors, data radios, data transfer devices, situational "awareness" computers and related parts/components? Does the Army's current movement toward reducing spares at the unit level support maintenance of digital systems?

While many difficult issues lie ahead, the Army is on the right track. Digital systems have brought a power whose limits have been barely touched by leaders at all echelons. Knowledge- and information-based operations bring a force with greater lethality, survivability and tempo than ever before to the battlefield. ADA is leading the way and, as always, is "First to Fire." ***MR***

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